KYAE Standards for Mathematics
Side by Side Summary

*** Bolded words indicate level at which concept is introduced**

	Level 1 (0 – 1.9)	Level 2 (2.0 – 3.9)	Level 3 (4.0 – 5.9)	Level 4 (6.0 – 8.9)	Level 5 (9.0 – 10.9)	
Recognize and Compare Numbers	**whole numbers 0 - 100**	up to **4-digit** whole numbers common **fractions** ($^1/_2$, $^1/_3$, $^1/_4$, $^1/_5$, $^1/_8$, $^1/_{10}$) **decimal values** through 2 places simple **decimal/fraction equivalencies**	up to **7-digit** whole numbers fractions: **numerator, denominator, proper, improper** and **mixed** decimal values through **4 places** fraction/decimal/**percent** equivalents for $^1/_2$, $^1/_{10}$, $^1/_4$, $^3/_4$ terms ***negative*** and ***positive*** with whole numbers	any set of whole numbers, fractions, decimals and **integers** equivalent fractions/decimals/percents for halves, thirds, fourths, fifths and tenths	use equivalencies between any fraction, decimal, mixed number or percent numbers in **scientific notation**	Recognize and Compare Numbers
Rounding and Estimation	**whole numbers to the nearest tens place**	whole numbers to the nearest tens through **thousands place** **estimate to check answers**	whole numbers to the nearest **hundred-thousands place** decimals to the nearest whole number through the **thousandths place** use in **mental calculations**	estimate measurements to solve word problems predict and check answers	use fractions, decimals, percents and square roots to estimate solutions to multi-step problems regularly use estimation to predict and check answers	Rounding and Estimation
Number Theory and Mathematical Symbols	properties of **addition and subtraction** with **whole numbers 1-100** symbols: **+, -, =**	the **properties of zero and one** properties of addition and subtraction with numbers **1 – 10,000** to solve problems and check answers model meanings of **multiplication** and **division** to whole numbers up to 100 symbols: **x, ÷,)‾‾‾, ≠, >,<**	**prime** and **composite numbers** **greatest common factor (GCF)** and **least common multiple (LCM)** **inverse operations** symbols: **%, algebraic symbols for multiplication, exponents** ^{2} and ^{3}	**commutative**, **associative** and **distributive properties** the inverse of ^{2} as √ symbols: **≤, ≥, ≈, °, ∠, ⊥, ‖, ∟, π**	apply divisibility, GCF, LCM, commutative, associative and distributive properties with rational numbers and **integer exponents** to solve problems apply number systems: whole numbers, integers and rational numbers to solve problems symbols: **( ),	|, ≅, ~**	Number Theory and Mathematical Symbols
Mathematical Operations	**add** and **subtract whole numbers to 100** with and without a calculator solve **situational problems** using addition and subtraction	add and subtract: up to and including **4-digit whole numbers** **proper fractions** with like denominators **decimals** to 2 places **multiply** using **facts through 10 x 10** **divide** without remainders solve situational problems using any of the 4 operations, with and without a calculator	add and subtract: up to and including **7-digit whole numbers** fractions and **mixed numbers** with like and **unlike denominators** decimals to **4 places** multiply and divide with and without **remainders** using **facts through 12 x 12:** whole numbers up to 3 digits by 10 or 100 **decimals** to 2 places use **multiple strategies** to solve situational problems	add, subtract, multiply or divide any whole number, fraction, mixed number and decimal with and without a calculator multiply and divide using **algebraic notation** compute 'squares' ^{2} and '**cubes**' ^{3} use multiple strategies to solve situational problems	apply operations to solve multi-step situational problems involving rational numbers, using a calculator as appropriate apply **absolute value** to operations with integers demonstrate basic **scientific calculator skills** use the **order of operations** to simplify expressions with rational numbers	Mathematical Operations
Measurements	use instruments to **measure** length, weight, capacity, time and temperature explore **equivalencies** using U.S. bills and coins (e.g., **quarters (¼)** and **half dollars (½)**)	uses of **customary** vs. **metric** measurement systems use common **customary conversions** relate the concepts of ¼ and ½ to quarter and half hours on an analog clock **make change** using U.S. currency and coins	use instruments to **measure in fractional units of ½ and ¼** use customary and metric **measurement abbreviations** use equivalencies involving measurements of time measure, calculate and label **perimeter** and **area**	measure length, weight, **volume**, time and temperature in fractional units apply customary and metric systems to situations visually estimate **angle** measurements, using a **protractor** to confirm answers	solve problems requiring conversions within the customary or metric measurement systems solve problems involving area, circumference and volume for a variety of plane and solid figures: angles, circles, triangles and other polygons, **inscribed figures**, rectangular solids and **cylinders**	Measurements

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Geometry	contrast **basic 2-D** and **3-D shapes** **perimeter** of **simple rectangular figures**	identify a **variety** of 2-D and 3-D shapes find the perimeter and **area** of rectangular figures	identify a variety of **plane and solid figures** **right angles** and line of **symmetry** in the environment solve situational problems of perimeter and area for **polygons** **transformations** of 2-D shapes	use terminology associated with: **lines**, angles, **triangles**, **quadrilaterals**, **polygons** with more than 4 sides, and **circles** apply formulas to solve problems of perimeter, area, **circumference** and **volume** for a variety of 2-D and 3-D figures identify transformations of figures on a **coordinate grid**	solve situational problems involving lines, angles, triangles and quadrilaterals use **regularity**, symmetry, **congruence** and **similarity** to analyze 2-D and 3-D shapes solve problems requiring use of the **Pythagorean Theorem**	Geometry
Ratios, % & Proportions	*Introduced at Level 2*	relate **percents (100% and 50%)** to **fractions** and **decimals**	identify and write **ratios** from word problems explain the part-whole relationship in fractions and percents **compute percent** when part and whole are given	identify and write ratios and **proportions** from word problems solve problems of percent using a variety of strategies, including **proportions**	solve problems of **percentage of increase and decrease** use proportions to express similarity of plane figures	Ratios, % & Proportions
Data Interpretation and Probability	forms of **data collection** key features of **data displays** (e.g., **lists, tables, graphs**)	extract information from lists, bar graphs and tables the concept of **probability** as likely or unlikely chances	classify types of graphs (line, bar, **pie** or **circle**) collect, interpret and represent data calculate simple **mean**, **median**, **mode** and **range** express probability as a **ratio**	read, interpret and compare data from a variety of representations apply measures of central tendency (mean, median, mode, range) to solve situational problems calculate probability in situational problems	analyze and interpret real-world data from newspapers and articles describe patterns in displayed data demonstrate the use of **scatter plots** to display **paired data** analyze the effect of changes in data on measures of central tendency apply the concepts of **dependent** and **independent probability**	Data Interpretation and Probability
Number Line and Grids	**add** and **subtract** numbers to 20 using **horizontal** and **vertical number lines** **cardinal directions** (N, S, E, W)	add, subtract, **multiply** and **divide** using a number line locate **halfway points** between whole numbers locate **secondary directions** (NW,SE, etc.)	compare **positive** and **negative numbers** using a number line use compass rose to as reference point for directions use **latitude** and **longitude coordinates** to identify locations on a map	add and subtract positive and negative **integers** using a number line identify the parts of a **coordinate grid** read, interpret and plot points in all **four quadrants** of a **coordinate grid**	apply **magnitude** to rational numbers using a number line graph **linear equations in two variables** on a coordinate grid determine the **slope** and the **x- and y-intercepts** of a line use coordinates to draw and describe transformations of geometric figures	Number Line and Grids
Algebra	**patterns** in everyday settings **missing values** in a **number sentence**	identify, **continue** and **create** simple patterns and **sequences** translate word problems into **equations** describe the concept of **variable** to represent an unknown quantity use **substitution** to determine solutions	analyze, describe and continue numerical and geometric patterns verbalize a rule for an **in-out table** read, write and solve simple **expressions** and equations from word problems use substitution to check answers	analyze and continue repeating and **growing patterns**, including in-out tables, and powers of 10 express relationships found in patterns as words, graphs, tables, or mathematical sentences **evaluate** expressions and solve one step equations in one **variable** identify perfect squares and square roots 0-144	work with **relations** and **functions** simplify, evaluate and solve expressions, **multi-step equations** and **inequalities** use algebraic expressions, equations, and inequalities to solve situational problems	Algebra